NOTES ON NEW AND RARE INDIAN DRAGONFLIES.

By

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(*With 2 Text Figures.*)

1. Hemicordulia asiatica, Selys.

Up to the year 1918 this rare dragonfly was only known from 2 males both of which had been taken in Assam. In the year mentioned whilst going over a collection of specimens sent from the Agriculture Institute, Pusa, I found a pair of these insects which had been taken some time before by Mr. Bainbrigge Fletcher at Shillong and had remained in the Pusa collection for some time unidentified.

Mr. Fletcher on his next visit to Shillong took a number of specimens both male and female on the Ward Lake and has sent me others since.

It was thought that the insect was localised to the N. W. until this year when I received a letter from Mr. Bainbrigge Fletcher who was staying in Kodaikanal stating that he had seen a Corduline on the lake there which much resembled *Hemicordulia asiatica*. He finally secured specimens both by the net and others which he found caught up in spider webs on sedges, on the borders of the lake and on receipt I found them to be true *H. asiatica*.

Mr. Bainbrigge Fletcher in his covering letter, when sending these specimens suggested that the insect would probably be found in the Nilgiris and in this he proved to be a true prophet. Two days after receiving his letter I had occasion to go down to Coonoor and there in a shady lane adjoining Sims Park took my first *H. asiatica*, a male, which was hawking insects up and down the road.

The same day on returning to Ooty I ran down to the lake and immediately saw a male and shortly afterwards several more, hawking along the banks. The insect is fairly common on the Lovedale lake as well as the Ooty lake from August to the 1st November, exuvia being common in September and larvæ not difficult to obtain amongst the grass and sedges lining both lakes.

I hope to obtain information of this insect from the lake in Newara-Eliya, Ceylon, next season and probably also from the lake at Mahableshwar. From the numbers seen it would appear that the insect is more common in the south than the far north.

2. Aciagrion paludensis, sp. nov.

2 males and one female at Masnagudi, Nilgiris, 4,500′; 2 males Avalanche, Nilgiris, 6,500′, Nov.-Dec. 1921.

Male. Abdomen 24 mm. Hindwing 15 mm.

Head. Face, cheeks epistome and lips pale blue with a fine, basal, black line to the labrum and a broad transverse band across the epistome, also black; eyes pale blue except for a broad, black cap on the upper pole; occiput and vertex black, the former with a transverse, oval postocular spot of pale blue on either side connected across the middle line by a narrow band of the same colour.

Prothorax, with a fine pale blue colour anteriorly, the posterior border finely pale yellow and the sides broadly pale blue.

Thorax black on the dorsum marked with narrow, pale yellow, humeral bands; the sides blue marked only by two small, black, linear spots posteriorly; tergum spotted with blue.

Legs white, the extensor surface of femora striped with black.

Wings hyaline, stigma small, equal in all four wings, sepia; postnodal nervures 9 in the forewing, 8 in the hind.

Abdomen pale blue marked with black as follows:—segment 1 with an obdurate, dorsal, black spot separated by a narrow, blue, apical annule from a

dorsal, black, thistle-shaped mark on segment 2. The latter mark connected by a short, narrow stalk to a narrow, black annule at the apex; segments 3 to 7 with broad, dorsal, black stripes connected to apical, black annules and separated from each other by narrow, blue, basal annules ; segment 8 all blue save for a dorsal, black mark shaped like a chess pawn with its apex directed basal. In the *Masnagudi* specimens this spot extends as far as the base but in the specimens from Avalanche it falls far short of it ; segment 9 entirely blue ; 10 with a dorsal, broad, X-like mark of black.

Anal superior appendages very small, foliate, triangular, strongly divaricate, black tipped with white ; inferior appendages small, conical and white.

Female. Abdomen 23 mm. Hindwing 15.5 mm.

Almost exactly similar to the male and differing only by the stouter abdomen, by the 8th segment having an uniformly, broad, black, dorsal stripe, segment 9, a large, basal, triangular, black spot and the 10th all blue. The anal border of the latter is strongly indented and raised into a prominent hump on the dorsum not however cleft on top as in the *Ischnura*. The spine on the ventral, apical aspect of segment 8 is white and very robust.

Hab. The *Masnagudi* specimens were found among sedges along the borders of the drinking water tank, whilst those from the plateau above were found in marshes. They are very conspicuous although so small, by reason of their bright blue colour and can be easily picked out from the more sombre coloured *Aciagrion hisopa* with which they mix. They are smaller and more slender than any of the other species of the genus.

I have seen a pair collected by Mr. Bainbrigge Fletcher at Simla, 23-5-1918, 7,000′, which apparently belongs to this species or is a local race. They differ only in having 8 instead of 9 postnodal nervures in the forewing, and the marking on the 8th segment which in the male is a plain wedge of black tapering from the apex of the segment to its base and unidented on its sides.

From *hisopa* and *tillyardi* the species may be distinguished by the fewer postnodal nervures and also by the 8th abdominal segment bearing a black marking (immaculate in the two species mentioned).

3. Anaciæschna donaldi, sp. nov.

As the description of this new species is shortly appearing in " Indian Dragonflies ", I refrain from here giving it in detail. Shortly it may be described as an *Anaciæschna* of the size and bulk of *Anax immaculifrons*, with the wings deeply and uniformly enfumed from base to apices and with the general colouring of the body, dark warm brown marked with brilliant apple green. It is one of the largest and finest of the Indian dragonflies so far discovered.

Mr. Bainbrigge Fletcher sent me a painting made by his wife of this insect from Kodaikanal this year and from it I was able to recognise an insect which I had had in my possession since 1908 in which year I had taken it at Kodai. (The note on the packet stated that the insect's colours were dark brown and bright apple green, but the colours had so faded that I was unable to make out any such markings, and so was reluctant to publish the species until I had more reliable data). A few days later I took a female of the same insect on the Ooty lake and a week later received another female from Mr. T. Hearsey from Yercaud Between the three of us we secured 6 females and saw probably another 6 (also females). Both Mr. Hearsey and Mr. Fletcher believe they have seen the males flying swiftly near the lakes, but I have not been as fortunate and up to date the whereabouts of the male and its appearance remain a complete mystery. I have recently found the larvæ of this insect in considerable numbers in the Lovedale lake, Ooty, and both Mr. Bainbrigge Fletcher and myself have found a number of exuvia. The venation on the wing covers of these latter has been very distinct and very easy to decipher. Quite a number of the exuvia and larvæ obtained are males so their scarcity is hard to explain. Adjacent jungles have been searched in vain and the ponds have been visited at dusk in the hope that

the insect might be a night-flyer as is its cousin *A. jaspidea*, but all in vain. During the past week I have found it breeding in marshes at Avalanche, Nilgiris, and such spots are probably its natural habitat as all standing waters in these and the Palni Hills are artificial and of comparatively modern formation. I have now a large number of larvæ and should be able to breed out some males in the next few months thus settling the identity of this puzzling insect.

4. Gynacantha o'doneli, sp. nov.

A single male from Hasimara, Duars, Bengal, collected by Mr. H. V. O'Donel.

Male. Abdomen 41 mm. Hindwing 39 mm. Anal appendages 4 mm. Closely resembles *G. millardi*, Fras., from Poona and Malabar, but differs from it by the 3rd segment being more constricted, by all four wings being uniformly enfumed and by its much smaller size which is equivalent to *G. saltatrix*, Martin. The relative sizes of abdomen and hindwing are however different, being 42-35 in *saltatrix* to 41-39 in *o'doneli*, and the dark T-shaped marking on the upper surface of the frons is absent in the latter.

The thorax is an uniform, olive green, paler below and with no traces of humeral bands.

Legs very pale brown with black spines.

Abdomen olivaceous green and brown marked with darker brown and black. apical rings at and towards the end of the segments. The first 2 segments are largely olivaceous green especially on the sides. The oreillets are large and robust and bear 5 to 6 robust spines on the posterior border.

Wings (very ragged in this specimen) deeply enfumed; nodal index:— $\frac{13\text{–}22 \mid 18\text{–}13}{16\text{–}14 \mid 15\text{–}15}$; trigones with 5 cells; hypertrigones traversed four times; 4-5 rows of cells between *Rspl.* and *Rs.* 3-4 between *Miv.* and *Mspl.*; membrane absent; anal triangle of 5 cells; stigma dark golden brown, over 3-4 cells braced.

Anal superior appendages long and slender, almost straight on the outer border, a little dilated after the 1st quarter inwardly, fringed with long hairs. black and inwardly directed and meshing with those of the other appendage, Inferior appendage triangular, nearly half the length of the superiors.

5. Amphithemis nigricolor, sp. nov.

One pair from Hasimara, Duars, Bengal, collected by Mr. H. V. O'Donel.

Male. Abdomen 23 mm. Hindwing 23 mm.

Head. Labium, labrum and epistome creamy white; frons and vesicle metallic blue; occiput black. Eyes reddish brown.

Rest of body, thorax, abdomen and legs matt black, except abdominal segments 2 and 3 which are quite white with pruinescence. There is also some slight pruinescence on the tergum.

Wings hyaline; stigma narrow, very dark brown, non-braced, over about 2 cells; extreme bases of wings slightly saffronated; membrane very small, cinereous; 2 rows of cells in the beginning of the discoidal field; trigones entire; subtrigones traversed once as also the hypertrigones; *Mspl.* absent; 1 cubital nervure to the forewings, 3 in the hind; nodal index $\frac{8\text{–}11\text{—}12\text{–}8}{9\text{–}9\text{—}10\text{–}7}$; the base of the hindwing very narrow, bevelled sharply off, no vestige of a loop.

Anal superior appendages resemble those of *A. vacillans* in shape, but the superior are only slightly longer than the inferior.

The abdomen is very slender, cylindrical and of even length throughout.

Female. Abdomen and hindwing 23.5 mm.

Very similar in shape to the male but slightly stouter and without its dainty elegance. The wings are broader, especially the hind where a distinct loop of 7 cells is found.

The reticulation in the apices of both right wings is aberrant and the right hind stigma is double the length of any of the others. The basal saffronation is deeper and more extensive ; in the right hindwing there is an aberrant cubital nervure situated close up to the trigone in the angle ; nodal index $\frac{7\text{–}12\text{—}12\text{–}7}{6\text{–}9\text{—}11\text{–}5}$; neuration otherwise as in the male.

Head similar to that of the male, but the labrum broadly bordered with black and the metallic of upper frons encroaching on the epistome.

Prothorax yellow with a black band in front ; posterior lobe small and depressed.

Thorax golden yellow changing to golden brown on the dorsum where there is a diffuse, humeral fascia only visible below ; a small, black streak on the upper part of the postero-lateral suture.

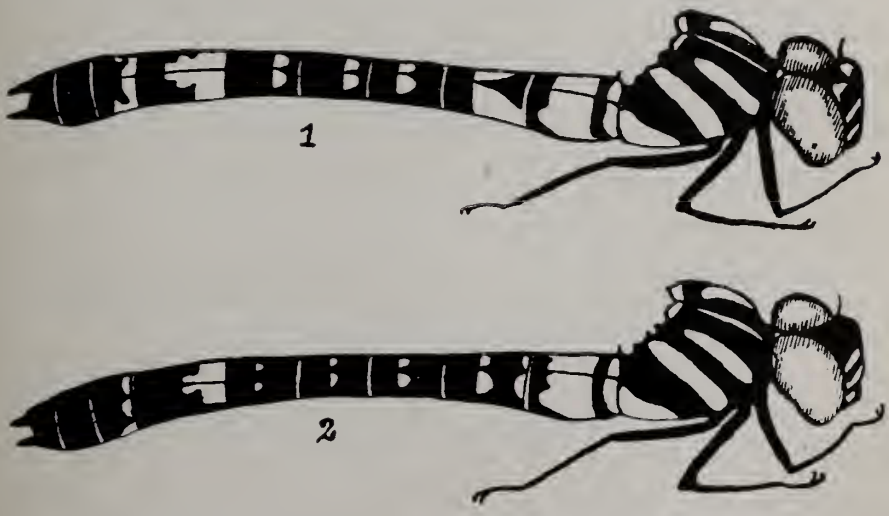
Legs rather long, slim and blackish brown in colour.

Abdomen blackish brown, segments 2, 3 and 4 having broad, light golden yellow, basal, annules, occupying 1-4th, 1-3rd and 1-7th respectively of the basal end of the segments, segments 5 to 7 with a small, basal, subdorsal spot of golden yellow, the rest immaculate.

Genital valves very similar to those of *A. curvistyl* , but the vulvar scale corrugated transversely.

The male is easily distinguished from other forms by its uniform black colour, except *A. vacillans* which in the adult stage is also matt black with abdominal segments 2 and 3 pruinosed white. (Mr. O'Donel informs me that this white mark is very conspicuous and it evidently serves the purpose of a distinguishing sexual mark.) From *vacillans*, *nigricolor* may be distinguished by the abdomen and hindwing being of the same length in both the sexes and also by its smaller size.

They apparently rest high as Mr. O'Donel informs me that he took the present pair by a swish of his topee whilst riding on the back of an elephant.



1. Semi-lateral view of *Macromia cingulata.*
2. Do. do. of *Macromia flavocolorata.*

6. Macromia flavocolorata, sp. nov.

A single female from Hasimara, Duars, Bengal, collected by Mr. H. V. O'Donel.

Abdomen 43 mm. Hindwing 38 mm.

Although the male of this insect has not yet been found, the markings of the female are so striking and different from other species of the genus that I have no hesitation in regarding it as new

It resembles *M. cingulata* by its brilliant clearly defined markings and is evidently allied to that species which has hitherto stood alone in a monotypic group, but there is no possibility of confusing the two.

The facial and abdominal markings differ widely from *cingulata* and the new species is a much larger insect.

Head. Labium with the lateral lobes brown, the base narrowly yellow, midlobe yellow, its border and a medial prolongation backwards brown; labrum shiny black with a transverse, bright citron yellow spot at its base; frons and face metallic bluish green with a broad,citron yellow spot traversing the epistome; vesicle and occiput black; eyes bluish green.

Prothorax small, yellowish.

Thorax metallic greenish blue marked with citron yellow as follows:—The antealar sinus and middorsal carina finely moderately broad, antehumeral stripes not quite reaching the alar sinus; laterally a broad, medial stripe and the posterior third of the metepimeron. Beneath white marked with 3 black, triangular spots arranged in a *fleur-de-lys*.

Abdomen tumid at the base, somewhat compressed, dilating again from the 7th segment, glossy jet black marked with clear, well-defined citron yellow marks as follows:—1st segment wholly citron yellow save for a narrow, dark, apical annule; 2nd segment similar but the annule rather broader, narrowing laterally and then sending a prolongation forwards beneath, on the dorsum the yellow invading it slightly; 3rd segment with a basal, subdorsal, linear spot and a medial, smaller, subquadrate, dorsal spot finely separated from its fellow by the black, dorsal crest. These medial spots repeated on segments 4, 5 and 6, but growing progressively smaller. On segment 7 the dorsal spots coalesce to form a very large, quadrate basal, spot occupying nearly half the segment and throwing a small projection analwards on either side of the dorsal crest. Segment 8 has a small, round, subdorsal, basal spot and a quadrate spot low down on the side at the basal end; 9 and 10 are unmarked.

Wings very patchily enfumed, with some slight evidences of dark saffronation at the extreme base; stigma small, black; 5 cubital nervures in the forewing, 4 in the hind; hypertrigones traversed 2-3 times in the forewing, twice in the hind; nodal index:— $\frac{9\text{-}15\text{—}15\text{-}6}{9\text{-}9\text{—}10\text{-}10}$

The clearly defined yellow markings will serve to separate this insect from all other Indian species whilst the more restricted and irregular abdominal markings will distinguish it from *cingulata*.